Claims.

1. A reconfigurable spatial light modulator system arrangement comprising:
a controller (4) for holding a compensated pattern;
a first spatial light modulator (3) having a plurality of addressable pixels controlled by the controller (4) each pixel being capable of modulating incident light and collectively replicating the compensated pattern;
a scatter plate (5) of known characteristics for scattering light from the first spatial light modulator (3);
optical means (6, 12) for directing light scattered by the scatter plate (5) and presenting a pattern (7) to an observer or detector;
the compensated pattern being related to both the scatter plate characteristics and to the pattern presented to the observer or detector.

2. The system of claim 1 wherein the scatter plate 5 has a number of surface features greater than the number of pixels on the first spatial light modulator 3.

3. The system of claim 1 wherein the controller (4) stores pre-calculated compensated pattern for each pattern to be displayed.

4. The system of claim 1 wherein the controller (4) is a computer with storage and means for calculating a compensated pattern for each pattern to be displayed.

5. The system of claim 1 wherein the controller (4) is a computer with storage and means for calculating both a computer generated hologram from a human readable format and a compensated pattern for each pattern to be displayed.

6. The display of claim 1 wherein the first spatial light modulator (3) is an electrically addressable liquid crystal spatial light modulator (EASLM) operable either in transmissive or reflective mode.

7. The system of claim 6 and further comprising a second spatial light modulator having a plurality of optically addressable pixels forming an optically addressable spatial light modulator (11) arranged to receive light from the first spatial light modulator (3) and modulate such received light onto the scatter plate (5).

8. The system of claim 7 wherein the optically addressable spatial light modulator (11) is a plurality (14) of individual optically addressable spatial light modulators (11) connected together in a tiled manner.

9. The system of claim 8 and including a scanner (15) for scanning light from the electrically addressable spatial light modulator (3) onto each individual modulator (11) in a sequence.

10. The system of claim 8 wherein the plurality of individual modulators (11) is operable either in transmission or reflective mode.

11. The system of claim 1 wherein the incident light is provided by one or more light sources (1) at one more different wavelengths or broadband (white) light.

12. The system of claim 1 wherein the incident light is provided to all pixels in the first spatial light modulator by a single light source (1).

13. The system of claim 1 wherein the incident light is provided to all pixels in the first spatial light modulator by a laser light source (1).

14. The system of claim 1 wherein the incident light is provided by one or more optical fibres.

15. The system of claim 1 and further including a detector (8).

16. The system of claim 15 wherein the detector is an array of detector elements.

17. The system of claim 15 wherein the detector is a bundle of optical fibres.

18. The system of claim 15 wherein the detector is a screen for receiving an image and viewing by an observer.

19. A method of providing a holographic image (7) to an observer (8) including the steps of:

providing a holographic engine (4) for storing a computer generated hologram pattern of an image to be displayed;

providing a spatial light modulator (3) having a large number of addressable pixels each capable blocking or passing light under the control of the engine (4);

controlling the spatial light modulator (3) so that the observer (8) receives a holographic image;

CHARACTERISED BY

providing a light scattering plate (5) of known characteristics to modify light from the spatial light modulator (3);

calculating and providing a compensated computer generated hologram pattern of an image to compensate for the known characteristics of the scattering plate (3) so that an observer (8) receives a holographic image (7).

20. The method of claim 16 wherein the compensated pattern is calculated using a direct binary search algorithm.

21. A method of increasing the range of diffraction angles from a computer designed diffraction structure including the steps of:

providing a holographic engine (4) for storing a computer generated pattern of a structure to be displayed;

providing a spatial light modulator (3) having a large number of addressable pixels each capable of modulating light under the control of the engine (4);

CHARACTERISED BY

providing a light scattering plate (3) of known characteristics to modify light from the spatial light modulator (3) and;

calculating and providing a compensated computer generated pattern of a diffractive structure to compensate for the known characteristics of the scattering plate so that an increased range of diffraction angles are obtained.